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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. 1162 Press ~~Mis.~~

235-36

Dated 9-4- 1869.

Not to be folded or roughly handled

Proceedings of the Madras Government, Public Works Department,
9th April 1869.

No. 235. Read the following letter from the Consulting Engineer for Irrigation and Canal Company, to the Secretary to Government, Public Works Department, dated Madras, 3rd March 1869, No. 122 :—

21 Plans.
22 Estimates.
2 Letters, in original, from Agent.

1. In their Order of the 22nd November 1867, No. 3,611, the Government reviewed the revised masonry estimates of the 7th Section, Main Canal, and, considering the explanations given regarding the expenditure incurred prior to the 31st May 1865 to be insufficient, retrenched Rupees 33,910. Some of the designs for the works were likewise considered to need revision, but, with a few exceptions, permission was given for going on with the works, pending the submission of a revised estimate with the necessary explanatory information. A revised estimate has now been forwarded, and I have the honour to submit the following remarks upon it.

Agent's letter No. 424, of the 18th instant, with Chief Engineer's of the 13th do.

2. The delay in the submission of these estimates is referred to in the last paragraph of the Chief Engineer's letter, and is explained to be due to a misunderstanding of paragraph 29 of the letter from this Office, the recommendations contained in which the Government approved and directed to be carried out.

3. The total of the estimate now submitted is Rupees 3,59,179-10-0, and as the existing sanctions, detailed at the end of the abstract estimate, amount to Rupees 1,30,179-10-0, the supplemental sanction asked for by the Chief Engineer is Rupees 2,29,000.

4. As some changes have been made in the works, I subjoin a table of those in the present estimate and in that of 1867, with the cost of each :—

Description.	Estimated cost in		
	1867.	1869.	
	RS.	RS.	
Jootoor Anicut and Head Works...	70,420	54,830	
Regulating Lock	12,110	33,010	
Bridge No. 1	9,662	11,210	
Culvert, 3 feet	* 728	† 840	* Expended up to June 1867.
Do. 10 feet	* 370	† 430	† Do. do. Oct. 1868, and works abandoned.
Do. 3 of 10 feet	* 6,465	† 7,550	* Expended up to June 1867 † Do. do. October 1868 } Work abandoned.
Do. 2 of 10 feet	1,223 }	2,740	Culvert abandoned.
Waste Weir 3-5 feet openings ...	1,221 }		
Bridge, second class	7,590	8,630	
Culvert	441 }	2,410	Culvert abandoned.
Waste Weir 4-5 feet openings ...	1,080 }		
Culvert 1 of 8 feet	3,732	... }	
Do. 2 of 5 ,, ...	...	2,905 }	
Waste Weir	22,720	10,570	
Culvert 1-8 feet vent	3,743	... }	
Do. 2-5 ,, ,, ...	...	2,855 }	
Do. 1 of 8 feet	6,263	...	*Vide* Rupees 4,250 of 1869, below.
Ferry boat...	660	... }	
Bridge, 2nd class	...	7,410 }	In lieu of ferry.
Culvert, 1 vent, 8 feet	...	4,250	

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Description.	Estimated cost in 1867.	Estimated cost in 1869.	
	RS.	RS.	
Waste Weir	14,323	16,050	
Bridge, 2nd class	...	7,190	Additional.
Culvert 2 of 20	17,795	15,640	
Do. 2 of 5	...	2,830	Additional.
Do. 1 of 3	1,918	1,860	
Bridge, 3rd class	...	5,620	In lieu of ferry. Entered lower down in estimate of 1867.
Ferry	660	...	
Culvert 1 of 3	1,844	1,620	
Do. 1 of 8	4,310	1,590	Abandoned. Catch water drain substituted.
Do. do.	3,708	140	Do. do.
Do. 1 of 10	6,377	... }	
Do. 6 of 5	...	10,170 }	
Bridge, 2nd class	7,590	7,830	
Do. 3rd do.	2,440	...	
Culvert	368	...	Abandoned. Old expenditure in estimate of 1869 appears to be included in Bridge, 2nd class, Rupees 7,830.
Ferry boat	660	...	Superseded by bridge.
Culvert 1 of 10	5,450	... }	
Do. 4 of 5	...	6,520 }	
Do. 1 of 10	6,046	1,380	Abandoned and drainage diverted. In 1867 the expenditure incurred was stated to be Rs. 1,494-3-6.
Aqueduct 5 of 10	* 18,571	13,070	* Including Rupees 381 on old Culvert No. 22.
Bridge, 2nd class	...	7,410	Additional.
Aqueduct 15 of 10	† 38,760	...	Including Rupees 60, spent up to June 1867, Nundial Tank, Main Channel.
Do. 22 of 10...	...	32,040	
Culvert 3 of 8	16,489	14,400	
Stanch	2,400	...	Not required.
Culvert 10 of 3	10,090	... }	
Do. 6 of 5	...	6,110 }	
Bridge, 1st class	14,380	13,000	
Culvert 1of 8	5,766	2,570	
Bridge, 3rd class	...	5,620	Additional.
Culvert 4 of 8	11,447	6,370	
Bridge, 2nd class	...	7,410	Additional.
Culvert 2 of 8	8,040	4,140	
Do. 1 of 3	...	210	Abandoned.
Bridge, 1st class	* 7,590	† 6,880	* Designed for 2nd class. † Do. for 1st do.
	3,55,450	3,47,340	

This statement shows an apparent decrease of Rupees 8,110, but the actual decrease is much more, the following deductions requiring to be made in order to afford a fair comparison :—

		RS.
1. Difference between estimates for regulating lock, the sum entered in 1867 being a transcript from the original estimate and altogether inadequate... ...		20,900
Difference between Bridge, 2nd class ...	Rs. 7,410	
and Ferry	,, 660	
		6,750

			RS.
Bridge, 2nd class (additional)			7,190
Culvert two vents of 5 feet (additional)			2,830
Difference between Bridge, 2nd class ...	Rs.	7,410	
and Ferry	,,	660	
			6,750
Bridge 3rd class (additional)			5,620
Do. 2nd do. (do.)			7,410
Difference between totals of the two years			8,110
			65,560
Deduct.			
Saving on abandonment of a culvert of one vent of 8 feet and substituting a catch-water drain	Rs.	2,720	
Do. do. on another culvert	,,	3,568	
Do. do. on one of one vent of 10 feet	,,	4,666	
Do. do. on stanch not required	,,	2,400	
			13,354
			52,206

So that the decrease on works included in both estimates is rather more than half a lac.

Jootoor Anicut and Head Works.

5. The Chief Engineer has decided to give up the idea of constructing an oblique anicut, and the plan now forwarded shows a direct anicut on the original line with its crest 10·53 feet above under-sluice sill, and the wings 21·53 above the same level. Mr. Latham has concluded, after enquiry, that this level for the wings will be sufficiently high. In Mr. Ross's letter,* to which the Chief Engineer refers, the highest flood mark pointed out by the villagers is stated to be 14·67 feet above head-sluice sill, and this is equal to 17·67 feet above under-sluice sill, so that the margin allowed is 21·53 — 17·67 = 3·86, and as the anicut was at the time of that fresh not more than half its full height, it would seem that this margin is hardly sufficient for safety. On the other hand, however, it must be mentioned that the length of the anicut is much greater than the former width of the river, the right bank of which has been lowered several feet, and the water-way, therefore, can hardly be compared with that existing in 1865. It would have been preferable, I think, had the sufficiency of the arrangements, as now designed, been more clearly demonstrated, but as this has not been done, and as I have not the data for making a calculation myself, I can only recommend the sanction of Mr. Latham's proposals on his responsibility: for the works are far advanced, and whatever may be found advisable in the future, there is hardly an alternative to completing them for the present according to the designs submitted. The way in which the anicut coping is to be secured is shown on the anicut plan. It is a modification of an arrangement suggested by me, and I think it will prove efficient.

Paragraph 3.

* Enclosed, attached to Chief Engineer's No. 77 24th April 1868, Agent's No. 40, 30th idem.

The overfall from the anicut is to be received on a water cushion five and a half feet in depth, and this will probably be sufficient. It is hardly likely, however, that

the thin flags of the flooring of the cushion will remain in position, and the top of retaining wall should be finished off with a curve on the edge next the cushion, and for this part large stone should be used. The bed of the river is shale, which, unaided, is not compact enough to stand the overfall, but which did not receive any such injury as to make the anicut wall insecure during the three or four years that water has passed over the unfinished weir. The retaining wall under the rear face of the body of the anicut, cross-section K. L., looks very unsubstantial, and will run some risk of being blown out. I believe this part of the work has been already completed.

General Plan of Head Works.

The general plan of the head works will afford a clear idea of their general arrangement. It shows the proposed position of the regulating lock, and of the navigation entrance to the canal from the Caulee. The navigation was originally intended to enter the vagu close to the under-sluices, and to use that channel up to the place where the excavation for the lock was formerly partly made. The present arrangements are, I think, as good as they can be made.

Regulating Lock.

6. The estimate, Rupees 33,010, for this work appears very large, but it includes Rupees 13,563 for the navigation channels above and below it and Rupees 2,140 expenditure on old site, of which latter work to the value if not more than about one-seventh has been done, and that will form part of the channel. I hope the earthworks will be executed for much less than the sum named in the estimate.

Waste Weir (Calingulah) No. 6.

Letter, paragraph 16.

7. This work was formerly estimated to cost Rupees 22,720, the present estimate is Rupees 10,570. It was noticed in sending up the estimates of 1867, and the revised design appears to me to be quite as efficient as, if not more so than, the more expensive arrangement. The weir itself should seldom discharge water, as the sluices will be more than sufficient. No rubble apron is shown below the retaining wall at the outer end of the packed apron of the sluices, but it will be advisable to allow one similar to that shown on the section at C. D., for it is more necessary for the sluices than for the rest of the work.

Waste Weir (Calingulah) No. 9.

Unless there be compact kunkur at the site of this work, at a level but little below the top of the retaining wall of the water-cushion, a rough stone apron outside this wall for a width of four or five yards will be required, and similarly a dry stone apron opposite the sluices, outside the retaining wall, will be necessary. The apron inside the latter retaining wall is not; as drawn in cross-section A. B., such as would be likely to stand. In addition to this weir a set of four sluices is intended to be placed in the vagu near the weir. A plan of this has been submitted, as also a plan showing its position with reference to the weir.

8. In paragraph 4 of his letter the Chief Engineer notices that, in commenting on the designs for the masonry works of the 1867 estimate, I pointed out that four feet abutments were not necessary for culverts of eight feet span, but that when recently inspecting the canal I mentioned to the Executive Engineer in charge that his abutments, which are two and a half feet thick, the dimension suggested by myself, were too thin. Mr. Latham has, however, overlooked the essential

difference of the conditions referred to on the two occasions. The designs of 1867 allowed a rise of two and a half feet, the culverts I saw under construction have a rise of one foot, and I think, therefore, that I was right in expressing different opinions on the two occasions, the thrust in the latter case being about four times as great as that in the former.

9. It appears to be unnecessary, under present circumstances, that I should criticize in detail the plans of all the minor masonry works included in the present estimate. The principal defect of the culverts lies in the flatness of the arches of many of them, which will entail the use of thicker abutment walls if they are to be made secure, and the Chief Engineer has already given instructions upon this point.

Nundial Tank Channel Aqueducts—
One of twenty-two arches of ten feet.
One of five do. do.

10. I have already reported* that the larger of these aqueducts has been partly constructed with a width of canal water-way of only thirty feet, instead of forty-five feet, the minimum width admissible.† The mistake is one of great importance, for the mean width of the canal is sixty to sixty-two feet, and the effect would be to produce a velocity of nearly three miles‡ an hour, which, with a boat of fifteen feet beam and three feet draught of water going up the canal, would be liable to be increased to four miles an hour. I cannot, therefore, recommend the sanction of these aqueducts, and the larger one, notwithstanding the expense of re-construction, should be widened to the full width of forty-five feet between the side walls.

* Letter No. 114, of the 10th instant, paragraph 17.

† Paragraph 18 of letter printed in Proceedings Madras Government of the 22nd November 1867.

‡ Yards 5,172.

11. Provision has been made in this estimate for all the additional bridges which were considered to be necessary, and which were included in the complete list of crossing given in the report marginally noted.

Paragraph 24, Proceedings Madras Government, 17th November 1868, No. 3,586.
Paragraph 28, Proceedings Madras Government, 22nd November 1867, No. 3,611.

All the bridges, with the exception of that commenced some years ago at Ayalore, will have two arches of thirty feet span each.

The Ayalore bridge revised design shows that it is intended to convert the skew into a square bridge. As this arrangement has been submitted by the Chief Engineer in preference to the plan of constructing the skew arches in echellon, I beg to recommend its sanction.

Paragraph 22, Proceedings Madras Government, 17th November 1868, No. 3,568.

12. The Chief Engineer has added Rupees 11,839-10-0 to the estimate to cover the cost of stores and store charges, on the ground that he has "no data upon which to arrive at the probable apportioning of these charges." The amount is not a large one, but it is five per cent. on the work, and there is an allowance in the body of the estimate of ten per cent. for contingencies. Moreover, the reason given for making this a separate charge is not really of any value, for the stores are obtained for some part of the work and should be paid for out of the estimate rates for that work, and store charges are simply a per-centage upon the value of the stores. If the Executive Engineer buys materials on the spot, he charges them at once to the work, and materials obtained from Madras or from some other depôt

under the general name of Stores should be similarly treated. An allowance for, General Plant is admissible, but one for Stores should not, for the future, be allowed to be shown in an estimate.

13. The rates for rubble and arch work masonry are in some cases a little high and the Chief Engineer (paragraph 6) alludes to this, and states that although the cost of the former work has not yet exceeded $4\frac{1}{2}$ Rupees, the progress made had been insufficient to prove whether this rate would every where be sufficient. I hope the Executive Engineer will be able to complete his works considerably within the estimate.

14. The papers which accompany these estimates really throw very little light upon the great difference* between the expenditure prior to 1865, and the value of the work done. Regarding a few of the works there is some explanation contained in Mr. Ross's letter,† but these were the works particularly named by me as those which from personal recollection I thought had not been correctly measured, and the result of the re-examination shows that the supposition was correct.

* *E. g., vide* Estimate for completion of Jootoor Anicut and Head Works.

	RS.
Value of work done at present Estimate rates	12,940
Expenditure	34,170

† Agent's No. 40.

It is very clear that there was great mismanagement of the 7th Section prior to the cessation of work, and no doubt the investigations which have been required will have had a beneficial effect in attracting attention to the want of proper care exhibited.

As it would seem that no further explanations are likely to be forthcoming, and as in the case of the 3rd Section, Government considered it unnecessary to enforce a retrenchment, I would suggest that the past expenditure on the 7th Section be admitted to the accounts.

Proceedings Madras Government, No. 593, dated 21st February 1868.

15. I beg also to recommend that these revised estimates, with the exception of the two aqueducts referred to in paragraph 10 above, be sanctioned, and that the Chief Engineer be requested to submit designs and estimates for these with a clear canal water-way of forty-five feet.

The amount to be sanctioned will then be—

			RS.
Amount of Estimate			2,29,000
Smaller Aqueducts	Rs.	13,070	
Larger do.	,,	32,040	
			45,110
Supplemental sanction now required			1,83,890

P. S.—There are mistakes in the Estimates, as shown in pencil, which would require an increase of 1,698 Rupees; but, as contingencies have been allowed for at the rate of ten per cent., and as the errors amount to less than one per cent. on the value, Rupees 2,29,125, of the work remaining to be done, I have not thought it necessary to make any change in the totals of the estimates.

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From the Assistant to Chief Engineer, to the Agent and Manager of the Madras Irrigation and Canal Company, dated Kurnool, 24th April 1868, No. 77.

With reference to Captain Mullins' No. 11, of 7th instant, forwarded with your endorsement No. 22, of 17th instant, I have the honour to hand you copy of answer to Memorandum of queries addressed to the Executive Engineer, Nundial Division, and granted in G. O. No. 3,611, of 22nd November, as an accompaniment to the Chief Engineer's letter No. 732, of 9th October 1867.

Drawings of the works requiring revision are in course of preparation, (viz., the 2nd Class Bridges, Calingulahs, Drawings 6 and 9). A revised drawing* and estimate to replace No. 27 I had the honour to forward already, as we wish to begin that work at once.

* See Agent's No. 37, of 29th April 1868, to Consulting Engineer.

With regard to the anicut, I conclude that our design, as submitted, may generally be allowed to stand, as the information we have now obtained, with regard to flood level in the main, tends to support our former data upon which the design was based. The west wings will need raising, and an amended design of this part with a supplemental estimate will be submitted.

From L. E. ROSS, Esq., Executive Engineer, Nundial Division, to the Chief Engineer of the Madras Irrigation and Canal Company, dated Ayalore, 1st April 1868, No. 346.

I have the honour to subjoin answers to the queries of the Consulting Engineer with reference to revised masonry estimates of this Division, forwarded with your 235, of 12th October last, to Mr. Perkes.

1*st.—Highest known flood at Jootoor.*—The only neighbouring village which abuts on the river is Jootoor, close to the anicut. On the 27th November 1867, I made a careful investigation regarding the highest known flood.

First, the Kurnum and Reddy were questioned as to the height the river rose to on the village bandy road, on the side nearest the anicut, and indicated a spot, which I shall call A.

Second, a ryot, whose vegetable garden came down at an angle on this road, further up the river, stated that in the highest flood he had known, there was barely room to pass between the water and his fence. This point I call B. Further up, on the back used by the women in drawing water, the Kurnum and villagers showed me a point which I shall call C. And again further on, on the open bank of the river, where it is steeper and more irregular, a point (D) was shown by a talkative old lady, supposed to be the "oldest inhabitant," and who had lived in a hut alongside for a considerable number of years.

On the same day these points were carefully levelled by Mr. Frericks and were afterwards checked by Surveyor Partridge, and their relative value found as follows :—

Datum (Head Sluice Cill 193·58 below Hindry datum)	0·00
Present top of Head Sluice	14·00
Top of Head Sluice as shown in revised plan	18·50
Point A	14·67
,, B	14·05
,, C	13·35
,, D	11·45

2*nd.—Work done, Jootoor Anicut.*—I am quite unable to say how the 101 cubic yards has been arrived at, nor was Mr. Perkes able to give me any information on the subject. The field book of measurements of Mr. Smart contains a sheet signed by that gentleman, and dated 3rd May 1867, showing quantity of work done at Jootoor, but this sheet gives the same figures as Mr. Perkes, $\frac{125}{907}$, of 17th July 1867, to you. As this question was one of decided complexity, I thought the safest way was to make my investigation completely independent, and now beg to hand you detailed measurement of the work already done towards Jootoor Anicut, with my estimate of its cost.

I have divided the work into two classes, viz., common rubble and dressed stone, and I think that this is all that is necessary ; the quoins, cut waters, and arch stones having received very little

more dressing than the facing of head and under-sluice walls, I have taken these walls as dressed back for a depth of eighteen inches.

3rd.—Excavation, Jootoor Anicut.—It is almost impossible to give a measurement of the excavation done, but I have checked the quantity given by Mr. Smart as well as I could, and conclude that the 7,000 cubic yards includes the entrance channel, the measurement of which is 532 cubic yards.

4th. Head Sluice Arch Work.—The whole of the arch work is finished, and amounts to 10 cubic yards as shown in my measurement attached.

5th. Calingulah 2.—The statement is incorrect. There are 473·83 cubic yards of masonry finished, 750 cubic yards of excavation, and 24·87 cubic yards silt to be removed, and 16 cubic yards of sand on the ground.

6th. Culvert 11.—There are 89·16 cubic yards of masonry done, and 1,562 cubic yards silt to be removed. The measurement of the work done here has been got at considerable expense.

No. 40.

COMMUNICATED with reference to the Consulting Engineer's letter No. 11 of 7th April 1868.

MADRAS, (Signed) F. H. HENSLOWE,
30th April 1868. *Agent and Manager.*

From the Agent and Manager of the Madras Irrigation and Canal Company, to the Consulting Engineer for Irrigation and Canal Company, dated Madras, 18th February 1869, No. 424.

1. I have the honour to forward, herewith, revised plans and estimates, as per accompanying list, for the masonry works of the 7th section, with copy of the Chief Engineer's letter, dated 13th February 1869, and request you will be good enough to obtain the early sanction of Government for the expenditure therein proposed.

2. The letter from Mr. Ross, referred to in paragraph 3 of the Chief Engineer's letter, was communicated to you with my No. 40 of 30th April 1868.

3. The enclosure alluded to in paragraph 7 has been called for, and shall be forwarded to you immediately on receipt.

From the Chief Engineer, to the Agent and Manager of the Madras Irrigation and Canal Company, dated Iddamuddaka, 13th February 1869.

Revised 7th Section, Masonry.

1. In reference to G. O. No. 3,611, of 22nd November 1867, I have the honour to submit a re-adjusted revised estimate, amounting to Rupees 2,29,000, for the masonry works of the 7th Section. The sum included for Agent's charges for stores and store charges, I have placed as a separate item for sanction, though these charges are carried from month to month to the debit of particular works, because I have no data upon which to arrive at the probable apportioning of these charges.

2. The quantities of useful work found done is stated in the beginning of each estimate except in culvert eight, where no charge is made in the estimate. No fresh information can be found to explain the disproportion between the quantity of work found and that would naturally be expected from the amount spent; certainly my experience of works will not permit me to price them fairly higher than the prices at Jupad and Turrigopully, and the prices there paid do not suffice to account for the expenditure in the 7th Section when applied to the quantity of work found to be usefully executed, though those prices are likely to be nearer the true cost than the prices at which work was generally executed in the adjacent 6th and 8th Sections. Consulting Engineer's letter to Secretary to Government, Department Public Works, No. 97 of 150/67, paragraph 6. In the estimates of the three bridges Nos. 3, 16, and 27, of which the first is in the ninety-third mile in my copy, the only mention of string courses is in the following item: "334 running feet, string course, at Annas 3, Rupees 62-10-0;" perhaps the 3 Annas has been entered in the wrong column in the copy sent the Consulting Engineer, but the *amount* would show them to be Annas not Rupees.

3. *Paragraph 7, Anicut.*—I have considered that the highest flood level was settled by Mr. Ross's No. 3 of 1st April 1868, sent to you, as agreeing with that submitted by me. I have now

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carried the anicut on the original site, with the modifications in the coping recommended by Captain Mullins, in order to save delay and avoid all confusion in afterwards settling the site for the lock.

4. The working drawings of the culverts have been made, and are those now submitted. By increasing the aggregate span and decreasing the depth of each culvert and some alteration of sites, I have obtained a system larger in area of waterway, less buried in the ground, and cheaper than those previously sanctioned In accordance with Captain Mullins's recommendation in paragraph 16, Mr. Ross has hitherto constructed the eight feet culvert with abutments 2 feet 6 inches, instead of 4 feet. This Captain Mullins, on his latest inspection, considered to be too light; and 3 feet thick with counterforts (averaging 4 feet thick in the average) will doubtless prove safe and not very extravagant. The modifications of the calingulahs from the sanctioned designs will, I hope, meet Captain Mullins's approval, as also the arrangements for Byupgoodoor tank. Nundial tank has been provided for already.

5. The new bridges, with increased spans as ordered for the rest, are included in the present estimate.

6. The rates for masonry have never yet exceeded Rupees 4-8-0 for rubble work. The progress hitherto, however, has not been sufficient to enable me to say that that rate was wisely prescribed as a limit.

7. Mr. Ross's letter gives all the available information on the points referred to by Captain Mullins.

8. I regret that the wording of the G. O. No. 3,611, of 22nd November 1867, paragraph 4, "Approving" of Captain Mullins's recommendations in paragraph 29, was misunderstood by me to "authorize me to proceed" with the anicut and other works mentioned in that paragraph, in the sense of authorizing the expenditure necessary to carry them on. It was only last autumn that I was assured that he did not sanction the expenditure of money required to complete the authorized work. Meantime I had the working drawing of all the works nearly ready to get the whole into form for submission in sufficient detail. This I have accordingly done. It is, however, now of great importance to get the approval of these plans, and also the permission to draw the money necessary for them as early as possible.

List of Revised Plans and Estimates of (7th Section) Masonry Works.

Description of Plans.	Estimates.
General Plans of Head Works.	Abstract Supplemental Estimate.
Jootoor Anicut.	Comparative Statement.
Regulating Locks.	Nundial Estimate No. 1.
Calingulah No. 2.	Do. No. 1 A.
Do. ,, 4.	Do. ,, 2.
Culvert ,, 4 and 7.	Do. ,, 3-7 A 16-19a 25a.
Calingulah ,, 6.	Do. Estimate No. 4.
Do. ,, 9.	Do. ,, 5-7-10 A
Detached emptying sluice.	Do. ,, 6
Plan of Pothala Vagoo.	Do. ,, 8-24.
Culvert 2 openings 20 feet.	Do. ,, 9.
Do. 1 do. 3 do.	Do. ,, 10.
Aqueduct Nos. 19 and 20.	Do. ,, 11-12.
Plan showing position of—	Do. ,, 11 A 24 A.
Aqueduct No. 20.	Do. ,, 15-22.
Culvert 3 openings 8 feet.	Do. ,, 17.
Plan alteration of Ayaloro bridge.	Do. ,, 19.
Culvert No. 24.	Do. ,, 20.
Do. ,, 25.	Do. ,, 21.
Do. ,, 26.	Do. ,, 23.
2nd and 3rd class Bridges.	Do. ,, 25.
5 Feet Culverts, general plans.	Do. ,, 26.

(True Copies.)

(Signed) F. H. HENSLOWE,
Agent and Manager.

Proceedings of the Madras Government, Public Works Department, 9th April 1869.

No. 236. ORDER THEREON, 9th April 1869, No. 1,162.

IRRIGATION, No. 8.

1. With this letter the Consulting Engineer for the Madras Irrigation and Canal Company submits masonry estimates, for the 7th Section of the Company's Main Canal, which have been revised with reference to the Order of Government of the 22nd November 1867, No. 3,611, in which sanction for the estimates, at that time submitted, and amounting to Rupees 3,55,450 was withheld; and, while permission was granted for the construction of many of the works, the Consulting Engineer was directed to place himself in communication with the Chief Engineer, with a view to the alteration of the designs of some of the works, and to the preparation of more reliable estimates. The Government also declined to admit an overcharge of Rupees 33,910 without full and sufficient explanations.

2. The estimates now received amount to Rupees 3,59,179-10-0, and they are somewhat in excess therefore of those prepared two years ago. Captain Mullins shows, however, that the present estimates include many additional works, and that, if the works included in both estimates be compared, there is a difference of rather more than half a lac in favour of those of this year.

3. With regard to the overcharges, the Consulting Engineer reports that the papers accompanying the estimates throw but little light upon the great difference between the expenditure prior to 1865, and the value of the work done; but, as there is little likelihood of any further explanations being obtainable, he recommends that the excess expenditure should be passed. From recent reports the Government have learnt that the arrangements under which the canal works are now being carried on are far more satisfactory than they were formerly, and they accede therefore to Captain Mullins' recommendation, and grant permission for the removal of the retrenchment of Rupees 33,910.

4. The Consulting Engineer also recommends the sanction of the revised estimates, with the exception of that part of them amounting to Rupees 45,110, which provides for two aqueducts, intended to carry the canal across the supplying channels of the Nundial tank. These aqueducts have been designed with a canal water-way of only thirty feet in width, although in Captain Mullins' letter, transmitting the estimates of 1867, and a copy of which was communicated to the Agent, it was pointed out that the proper width would be forty-five feet. The Chief Engineer has given no explanation as to his reasons for adopting a design against the sufficiency of which strong grounds had been advanced; and, as the Right Honorable the Governor in Council concurs with the Consulting Engineer in considering that the velocity of three miles an hour, which, it has been shown, would be necessary to pass the full supply of the canal, would be extremely objectionable on a first class canal of navigation, he must withhold sanction to the designs as submitted, and they should be revised so as to provide a clear width of forty-five feet. His Excellency regrets that, owing to the commencement of one of these aqueducts in anticipation of the approval of the design, there will be some delay and also loss of money occasioned by the change; but, so far as he can judge, neither the Government nor the Consulting Engineer are in any way responsible for these results.

Proceedings of the Madras Government, Public Works Department,
9th April 1869.

5. Deducting the estimated cost of the aqueducts, the supplemental sanction required is for Rupees 1,83,890, and this is accordingly granted.

(True Extract.)

Colonel, R. E.,
Secretary to Government.

To the Consulting Engineer for Irrigation and Canal Company.
,, Manager for do. do.

Exd. S. T. Augustin.

Consulting Engineer's Office
Irrigation Canal Company
Madras, 3rd March 1869.

Encl. 45.
21 Plans
2 Estimates
letters & copy
from Agent

No. 122

From,

Captain, J. Mullins, M.C.
Cons. Engr. for I. & C. Co.

To,

The Secretary to Government
Department of Public Works.

Sir,

In their order of the 22nd November 1867 No. 3611, the Government reviewed the revised Masonry Estimates of the 7th Section Main Canal and, considering the explanations given regarding the expenditure incurred prior to the 31st May 1865 to be insufficient retrenched Rupees 33,910 - Some of the designs for the works were likewise considered to need revision, but, with a few exceptions, permission was given for going on with the works, pending the submission of a revised estimate with the necessary explanatory information. - A revised Estimate has now been forwarded and I have the honor to submit the following remarks upon it. -

Agent's letter No. 424 of the 18th inst. with Chief Engr. of the 13th do.

2. The delay in the submission of these estimates is referred to in the last para. of the Chief Engineer's letter, and is explained to be due to a misunderstanding of para. 29 of the letter from

this

this office, the recommendations contained in which the Government approved and directed to be carried out.-

3. The total of the Estimate now submitted is Rupees 3,59,179-10-" and as the existing sanctions detailed at the end of the Abstract estimate amount to Rupees 1,30,179-10-", the supplemental sanction asked for by the Chief Engineer is Rupees 2,29,000.-

4. As some changes have been made in the works, I subjoin a table of those in the present estimate and in that of 1867 with the cost of each.-

Description	Estimated cost in 1867 Rs:	Estimated cost in 1869 Rs:	
Sootoor Anicut & head works	70,420	54,830	
Regulating Lock	12,110	33,010	
Bridge No. 1	9,662	11,210	
Culvert 3 feet	728×	840*	× Expended up to June 1867.
Do. 10 "	370×	430*	* do do Octr. 1868 and works abandoned.-
Do. 3 of 10 feet	6465×	7550*	× Expended up to June 1867 } work * do do Octr. 1868 } abandoned
Do. 2 of 10 "	1,223	} 2740	Culvert abandoned-
Waste weir 3-5' openings	1,221		
Bridge 2nd Class	7590	8630	
Culvert	441	} 2,440	Culvert abandoned
Waste weir 4-5 feet openings	1,080		
Culvert 1 of 8 feet	3,732		
do 2 of 5 "		2905 }	
Waste weir	22720	10,570	
Culvert 1-8 feet vent	3,743		
do 2-5 " "		2,855 }	
do 1 of 8 feet	6,263		Vide Rs: 4,250 of 1869 below.
Ferry boat	660		
Bridge 2nd Class		7,410 }	In lieu of ferry.
Culvert 1 vent 8 feet		4,250	
Waste weir	14,323	16,050	
Bridge 2nd Class		7190	Additional.

Culvert

Description	1867	1869	
Culvert 2 of 20	17795	15640	
do 2 of 5	—	2830	Additional
do 1 of 3	1918	1860	
Bridge 3rd Class	—	5620	In lieu of ferry – entered lower down in Estimate of 1867.
Ferry	660	—	
Culvert 1 of 3	1844	1620	
do 1 of 8	4310	1590	Abandoned – Catch water drain substituted
do do	3708	140	do do
do 1 of 10	6377	—	}
do 6 of 5	—	10170	}
Bridge 2nd Class	7590	7830	
do 3rd do	2440	—	
Culvert	368	—	Abandoned – old expenditure in Estimate of 1869 appears to be included in Bridge 2nd Class Rs. 7830.
Ferry boat	660	—	Superseded by bridge.
Culvert 1 of 10	5450	—	}
do 4 of 5	—	6520	}
do 1 of 10	6046	1380	Abandoned and drainage diverted – In 1867 the expenditure incurred was stated to be Rs 1494.3.6
Aqueduct 5 of 10	18571 x	13070	x Including Rs. 381 on old culvert No. 22.
Bridge 2nd Class	—	7410	Additional.
Aqueduct 15 of 10	38760 *	—	Including Rs. 60 spent up to June 1867 Nundial Tank Main Channel.
do 22 of 10	—	32040	
Culvert 3 of 8	16489	14400	
Staunch	2400	—	Not required.
Culvert 10 of 3	10090	—	}
do 6 of 5	—	6110	}
Bridge 1st Class	14380	13000	
Culvert 1 of 8	5766	2570	
Bridge 3rd Class	—	5620	Additional.
Culvert 4 of 8	11447	6370	
Bridge 2nd Class	—	7410	Additional.
Culvert 2 of 8	8040	4140	
do 1 of 3	—	210	Abandoned.
Bridge 1st Class	7590 x	6880 *	x Designed for 2nd Class. * do for 1st do
	355450	347340	

This statement shews an apparent decrease of Rupees 8110 but the actual decrease is much more, the following deductions

deductions requiring to be made in order to afford a fair comparison:—

1. Difference between estimates for Regulating Lock, the sum entered in 1867 being a transcript from the original estimate and altogether inadequate ——— Rs: 20,900

Difference between Bridge 2nd Class 7,410 and ferry ——— 660		6,750
Bridge 2nd Class (additional) ———	"	7,190
Culvert 2 vents of 5 feet (additional) ———	"	2,830
Difference between Bridge 2nd Class Rs: 7,410 and ferry ——— " 660		6,750
Bridge 3rd Class (additional) ———	"	5,620
— Do — 2nd — do — do —) ———	"	7,410
Difference between totals of the 2 years —	"	8,110
		65,560

Deduct.

Saving on abandonment of a culvert of 1 vent of 8 feet and substituting a Catch water drain ———	Rs: 2,720	
— Do — Do on another culvert —	" 3,568	
— Do — Do on one of 1 vent of 10 feet —	" 4,666	
— Do — Do on Stanch, not required —	" 2,400	13,354
		52206

So that the decrease on works included in both estimates is rather more than half a lac.—

5. The Chief Engineer has decided to give up the idea of constructing an oblique Anicut, and the plan now forwarded shews a direct Anicut on the original line with its crest 10.53 feet above under-sluice sill, and the wings 21.53 above the same level. Mr Latham has concluded, after enquiry, that this level for the wings will be sufficiently high.— In Mr Ross's letter to which the Chief Engineer refers, the

Cootoor Anicut and Head works.—

para: 3.

×Enclosed, attached to Ch: Engrs No 77–24th April 1868 Agents No 40–30th idem.

3

the highest flood mark pointed out by the villagers is stated to be 14.67 feet above Head sluice sill and this is equal to 17.67 feet above under sluice sill, so that the margin allowed is 21.53 − 17.67 = 3.86 and as the Anicut was at the time of that fresh not more than half its full height, it would seem that this margin is hardly sufficient for safety. On the other hand however it must be mentioned that the length of the Anicut is much greater than the former width of the river the right bank of which has been lowered several feet, and the waterway there=fore can hardly be compared with that existing in 1865. It would have been preferable, I think, had the sufficiency of the arrangements, as now designed, been more clearly demonstrated, but as this has not been done, and as I have not the data for making a calculation myself, I can only re=commend the sanction of Mr Latham's proposals on his responsibility, for the works are far advanced, and whatever may be found advisable in the future, there is hardly an alternative to com=pleting them for the present according to the designs submitted.

The way in which the Anicut coping is to be secured is shewn on the Anicut plan. It is a modification of an arrangement suggested by me, and I think it will prove efficient.

The overfall from the Anicut is to be received on a water cushion 5½ feet in depth and this will probably be

be sufficient.- It is hardly likely however that the thin flags of the flooring of the cushion will remain in position, and the top of retaining wall should be finished off with a curve on the edge next the cushion, and for this part large stone should be used.- The bed of the river is shale, which, unaided, is not compact enough to stand the overfall, but which did not receive any such injury as to make the Anicut wall insecure during the 3 or 4 years that water has passed over the unfinished weir.- The retaining wall under the rear face of the body of the Anicut, Cross section K.L., looks very unsubstantial, and will run some risk of being blown out.- I believe this part of the work has been already completed.-

The General Plan of the Head works will afford a clear idea of their general arrangement. It shews the proposed position of the Regulating Lock, and of the Navigation entrance to the Canal from the Caulee.- The navigation was originally intended to enter the vagu close to the under sluices, and to use that channel up to the place where the excavation for the lock was formerly partly made.- The present arrangements are, I think, as good as they can be made.- General Plan of Head works.

6. The Estimate, Rupees 33,010, for this work appears very large, but it includes Rupees 13,563 for the Navigation channels above and below it and Regulating Lock.

Rupees

Rupees 2,140 expenditure on old site, of which latter work to the value if not more than about $\frac{1}{7}$th has been done, and that will form part of the channel. I hope the earthworks will be executed for much less than the sum named in the estimate.—

Waste weir (Calingulah) No. 6.—
letter para: 16.

7. This work was formerly estimated to cost Rupees 22720, the present estimate is Rupees 10,570. ~~This work~~ It was noticed in sending up the estimates of 1867, and the revised design appears to me to be quite as efficient as, if not more so than, the more expensive arrangement. The weir itself should seldom discharge water, as the sluices will be more than sufficient. No rubble apron is shewn below the retaining wall at the outer end of the packed apron of the sluices, but it will be advisable to allow one similar to that shewn on the Section at **C.D.** for it is more necessary for the sluices than for the rest of the work.—

Waste weir (Calingulah) No. 9.

Unless there be compact kunkur at the site of this work, at a level but little below the top of the retaining wall of the water cushion, a rough stone apron outside this wall for a width of 4 or 5 yards will be required, and similarly a dry stone apron opposite the sluices, outside the retaining wall, will be necessary. The apron inside the latter retaining wall is not, as drawn in Cross Section A.B, such as would be likely to stand.— In addition to this weir a set of 4 sluices is intended to be placed in the vagu near the weir. A plan of this has

has been submitted as also a plan shewing its position with reference to the weir.

8. In para: 4 of his letter the Chief Engineer notices that, in commenting on the designs for the Masonry works of the 1867 estimate, I pointed out that 4 feet abutments were not necessary for culverts of 8 feet span, but that when recently inspecting the Canal I mentioned to the Executive Engineer in charge that his abutments, which are 2½ feet thick, the dimension suggested by myself, were too thin. Mr. Latham has however overlooked the essential difference of the conditions referred to on the two occasions. The designs of 1867 allowed a rise of 2½ feet, the culverts I saw under construction have a rise of 1 foot, and I think therefore that I was right in expressing different opinions on the two occasions, the thrust in the latter case being about 4 times as great as that in the former.

9. It appears to be unnecessary under present circumstances that I should criticize in detail the plans of all the minor masonry works included in the present estimate. The principal defect of the culverts lies in the flatness of the arches of many of them, which will entail the use of thicker abutment walls if they are to be made secure and the Chief Engineer has already given instructions upon this point.

10 I have already reported[x] that the larger of these Aqueducts has been partly constructed with a width of Canal water way of only 30 feet instead of 45 feet, the

Nundial Tanti Channel Aqueducts
1 of 22 arches of 10 feet
1 of 5 do do
[x] letter No. 114 of the 10th inst. para: 17

* para: 18 of letter printed in P.M.G. of the 22 Nov/67.- the minimum width admissible.- The mistake is one of great importance for the mean width of the Canal is 60 to 62 feet, and the effect would be to produce

\# yards 5172. a velocity of nearly 3# miles an hour which, with a boat of 15 feet beam and 3 feet draught of water going up the Canal, would be liable to be increased to 4 miles an hour.- I cannot therefore recommend the sanction of these Aqueducts, and the larger one, notwithstanding the expense of reconstruction, -- should be widened to the full width of 45 feet be=tween the side walls.-

11. Provision has been made in this estimate for all the additional bridges which were considered to be necessary, and which were included in the com=plete list of crossings given in the report mar=ginally noted.-

para: 24- P.M.G. 17th Novr. 1868 No. 3586.-

All the bridges with the exception of that com=menced some years ago at Ayalore will have 2 arches of 30 feet span each.-

para: 28- P.M.G. 22nd Novr. 1867 No. 3611.

The Ayalore Bridge revised design shews that it is intended to convert the skew into a square bridge.- As this arrangement has been submitted by the Chief Engineer in preference to the plan of constructing the skew arches in echellon I beg to recommend its sanction.-

para: 22- P.M.G. 17th Novr. 1868 No. 3586.-

12 The Chief Engineer has added Rupees 11,839-10-" to the estimate to cover the cost of Stores and Store charges on the ground that he has "no "data upon which to arrive at the probable

apportioning

"apportioning of these charges." The amount is not a large one, but it is 5 per cent on the work, and there is an allowance in the body of the estimate of 10 per cent for contingencies. Moreover the reason given for making this a separate charge is not really of any value, for the Stores are obtained for some part of the work and should be paid for out of the estimate rates for that work, and Store charges are simply a per centage upon the value of the stores. If the Executive Engineer buys materials on the spot he charges them at once to the work, and materials obtained from Madras or from some other Depôt under the general name of Stores should be similarly treated. An allowance for General Plant is admissible, but one for Stores should not for the future be allowed to be shewn in ~~one~~ an estimate.

13. The rates for rubble and archwork masonry are in some cases a little high, and the Chief Engineer (para: 6) alludes to this and states that although the cost of the former work has not yet exceeded 4½ Rupees, the progress made had been insufficient to prove whether this rate would everywhere be sufficient. I hope the Executive Engineer will be able to complete his works considerably within the estimate.

14. The papers which accompany these estimates really

*e. g. vide Estimate for completion of Soottoor Anicut & Headworks.—
Value of work done at present Estimate rates } Rs: 12,940
Expenditure ——— 34,170

*Agent's No. 40.

really throw very little light upon the great difference* between the expenditure prior to 1865, and the value of the work done.— Regarding a few of the works there is some explanation contained in Mr. Ross's letter*, but these were the works particularly named by me as those which from personal recollection I thought had not been correctly measured and the result of the reexamination shews that the supposition was correct.—

It is very clear that there was great mismanagement of the 7th Section prior to the cessation of work, and no doubt the investigations which have been required will have had a beneficial effect in attracting attention to the want of proper care exhibited.—

As it would seem that no further explanations are likely to be forthcoming and as in the case of the 3rd Section Government considered it unnecessary to enforce a retrenchment, I would suggest that the past expenditure on the 7th Section be admitted to the accounts.—

P.W.G. No. 593 dated 21 Feby/68.—

15. I beg also to recommend that these revised estimates ~~be~~, with the exception of the two Aqueducts referred to in para: 10 above, be sanctioned, and that the Chief Engineer be requested to submit designs and estimates for these with a clear Canal waterway of 45 feet.—

The amount to be sanctioned will then

be

be:

Amount of Estimate	Rs:	229,000
Smaller Aqueduct Rs: 13,070		
Larger — do — 32,040		45,110
Supplemental sanction now required		183,890

[illegible]
[illegible]

I have the honor to be,
Sir,
Your most obedient servant,
[illegible] Capt. [illegible]
Cons Engr for S.H.C. Company.—

P.S. There are mistakes in the Estimates as shewn in pencil which would require an increase of 1,698 Rupees; but, as Contingencies have been allowed for at the rate of 10 per cent, and as the errors amount to less than 1 per cent on the value, Rupees 229,125, of the work remaining to be done, I have not thought it necessary to make any change in the totals of the estimates.—

[illegible]

13

Copy in a Letter to England
D/ 6th July No. 24 of 1869.

No. 92 P.W. 1869 Dept
From Proof Govt. for April 1869.

The Cons: Engr. S.W.C.Co.

To

The Secretary to Government
N.W.P.

Dated 3
Recd. 4 } March 1869

2-E- Recd

E 45

No. 1162 - 9th April /69.

Submits for the Considera-
tion of Govt. a revised
Estimate of the Masonry
works of the 7th Section
Main Canal with certain
observations

No. 235

C. 13th March 1869 R. 207

No. 77

Madras Irrigation & Canal Co.
Chief Engineer's Office
Kurnool 24th April 1868

To
J. H. Heaslowe Esqre
Agent & Manager
Madras

Sir,

With reference to Captain Mullins's No. 11 of 7th Inst. forwarded with your endorsement No. 22 of 17th Inst. I have the honor to hand you copy of Answers to memo of Queries addressed to the Executive Engineer of Kurnool Division & printed in G. O. No. 3611 of 22nd November as an accompaniment to the Chief Engineer's letter No. 732 of 9th October 1867.

Drawings of the works requiring

requiring revision are in
course of preparation (viz.
the 2nd Class Bridges, Calingulahs
Drawings 6 & 9). A revised
Drawing & Estimate to replace ⁺ See Report
No: 27 I had the honor to for- No 37 of 29/4/6[illegible]
-ward already, as we wish to Cons: Engr.
to begin that work at once

With regard to the Aniçut
I conclude that our design
as submitted may generally
be allowed to stand, as the
information we have now
obtained with regard to
flood level in the main
tends to support our former
data upon which the design
was based. The west wings
will need raising, and an
amended design of this part
with a Supplemental Estimate
will

will be submitted

15

I have the honor to be
Sir,
Your most Obt St.
(Sd) J. F. Schwartz
Asst. to Chief Engineer

[illegible] intended
[illegible]

101 – 21 Dec 67

No 346 M. Ir. & C. C.

N. Mural Division

Ayalore 1st April /68.

To

The Chief Engineer

Sir,

I have the honor to Subjoin Answers to the Queries of the Consulting Engineer with reference to revised Masonry Estimates of this Division forwarded with yours 235 of 12th October last to Mr Parker.

1st Highest Known flood at Jootoor

The only neighbouring village which abuts on the river is Jootoor close to the anicut. On the 27th November 1867 I made a careful investigation regarding the highest known flood.

First.

First the Kunmun & Reddy were questioned as to the height the river rose to, on the village Sandy road, on the side nearest the amicut, and indicated a spot which I shall call A.

Second, a ryot whose vegetable garden came down at an angle on this road, further up the river stated that in the highest flood he had known, there was barely room to pass between the water and his fence. This point I call B. Further up, on the track used by the women in drawing water the Kunmun & Villagers shewed me a point which I shall call C. And again further on

on, or the open banks of the river where it is steeper and more irregular a point: (D) was shewn, by a talkative old lady supposed to be the "oldest inhabitant" and who had lived in a hut, along side for a considerable number of years.

On the same day these points were carefully levelled by Mr Frericks and were afterwards checked by Surveyor Partridge and their relative values found as follows

Datum (Head Sluice Cill 93.58 below Himory datum }	0-00
Present top of Head Sluice	14.00
Top of Head Sluice as shewn in Revised Plan }	18.50
Point A	14.67 +3 = 17.67 above [illegible] sluice cill
" B	14.05
" C	13.35
" D	11.45

and

2nd Work done Jootoor Anicut – I am quite unable to say how the 101 C yards has been arrived at nor was Mr Perkes able to give me any information on the subject – The field book of measurements of Mr Orval contains a sheet signed by that Gentleman and dated 3rd May/67 showing quantity of work done at Jootoor but this sheet gives the same figures as Mr Perkes 125/907 of 17th July 1867 to you. As this question was one of decided complexity I thought the safest way was to make my investigation completely independent and now beg to hand you detailed measure-ment of the work already done towards Jootoor Anicut.

on the

with my Estimate of its Cost.

I have divided the work into two Classes viz Common rubble & dressed stone and I think that this is all that is necessary, the quoins, Cut waters & arch stones having received very little more dressing than the facing of Head and under Sluice walls. I have taken these walls as dressed back for a depth of 18"

Which the[illegible] certainly [illegible] as the na[illegible] surface [illegible] stone is [illegible] being [illegible] beds.

3 Excavation Foundations Aneal[illegible]

It is almost impossible to give a measurement of the excavation done, but I have checked the Quantity given by Mr. Smart as well as I could, and Conclude that the 7000 C yards includes the entrance Channel & the

measurement

measurement of which is 532 C yards.

4 Head Sluice Arch work. The whole of the arch work is finished and amounts to 10 C yards as shewn in my measurement attached.

5. Calingulah 2 The Statement is incorrect. There are 473.83 C yds of Masonry finished 750 C yds of Excavation and 24-87 C yds silt to be removed and 16 C yds of sand on the ground.

6 Culvert 11. There are 89-16 C yds of Masonry done & 1562 C yds silt to be removed

The measurement of the work done here has been got at at considerable expense

Shaw & Co

1 True Copy 1807 E. E. Ross
Ex. Engineer

1807 J. F. Schwartz
Asst to Chief Engineer

No. ~~[illegible]~~ 40.

Communicated with reference to the Consulting Engineer's Letter No. 11 of 7th April 1868 –

F. Hartnell Newton

Agent and Manager

Madras
30th April /68

To Gov. Blount 13 June 1793

Copy in a Letter to Seagrove

of 6th July — No. 24 — 1793

19

18

To Govt. No. 122 d/ 3d march /69

Copy in a Letter to England
d/ 6th July No. 24 of 1869.

Revd

No. 84

Reg

No. 40

From

The Agent & Manager
J & Co.

To

The Consulting Engr.
J & Co.

C.W. 859/69

Dated 30th Apl./68

Recd. 4 May/68

Pros. 9 April /69 In P. 235.

Forwards copy of the Chief Engr's letter No. 77 of the 24 Apl./68 together with its accompaniment replying to the queries with reference to the revised masonry estimates of the 7 Sectn.

Recd Ex.

50 14

Iddamuddaka
13th Feby 1869

To

The Agent

20

Revised 7th Section Masonry

1 In reference to G. C. No. 3611 of 22nd November 1867 I have the honor to submit a re-adjusted revised Estimate amounting to Rupees 229,000 for the masonry works of the 7th Section. The Sum included for Agents charges for Stores and Store charges I have placed, as a separate item for sanction, though these charges are carried from month to month to the debit of particular works, because I have no data upon which to arrive at the probable apportioning of these charges.

...ces are a part of the work & there... should be included in ...works

2 The quantities of useful work found done is stated in the beginning of each Estimate except in Culvert 8 where no charge is made in the Estimate. No fresh information can be found to explain the disproportion between the quantity of work

works found and that would naturally
be expected from the amount spent.–
Certainly my experience of works will
not permit me to price them fairly
higher than the prices at Jupâr and
Tarrijopully: and the prices there paid
do not suffice to account for the
expenditure in the 7th Section when
applied to the quantity of work
found to be usefully executed,
though those prices are likely to be
nearer the true cost, than the
prices at which work was generally
executed in the adjacent 6th & 8th Sections.
Consulting Engineers letter to Secretary
to Government D.P.W. No: 97 of 150 Phy.
paragh. In the Estimates of the 3
bridges No. 3, 16 & 27 of which the
first is in the 93rd mile, in my
copy the only mention of string
courses is in the following item "33½
Running feet, String Course at 0-3-0
Rupees 12„10„0" perhaps the 3 Annas
has been entered in the wrong
Column in the Copy sent the
Consulting Engineer but the amount
would

Quite the reverse
the entry is 377
linft rate 3 As.
value Rupees 1131

would shew them to be unnecessary. 3 Para of Anicut. I have considered that the highest flood level was settled by Mr. Ross' No 3 of 1st April /58 sent to you, as agreeing with that submitted by me. I have now carried on the anicut on the original site, with the modifications in the Coping recommended by Captain Mullins, in order to save delay and avoid all confusion in afterwards settling the site for the Lock.

4. The working Drawings of the Culverts have been made, and are those now submitted. By increasing the aggregate span & decreasing the depth of each Culvert & some alteration of sites, I have obtained a system larger in area of waterway, less buried in the ground & cheaper than those previously sanctioned. In accordance with Captain Mullins' recommendation in para 16 Mr. Ross has hitherto constructed the 8 ft. Culvert with abutments 2' 6" instead of 4' 0" – this Captain Mullins in his latest inspection

considered

[illegible] the plans. It was I think the difference in the rise that influenced my opinion – The rise was 2½' and it is now 1 foot.

considered to be too light, and 3'0 thick with Counterforts (averaging 4'0 thick in the average) will doubtless prove safe, and not very extravagant. The modifications of the Calingulahs from the sanctioned designs will, I hope, meet Captain Mullins' approval. As also the arrangements for Byupgoodoor tank. Numbral tank has been provided for already.

5 The new bridges, with increased spans as ordered for the rest, are included in the present Estimate.

6 The rates for masonry have never yet exceeded Rs. 4-8-0 for rubble work. The progress hitherto however has not been sufficient to enable me to say that that rate was wisely prescribed as a limit.

7 Mr. Ross' letter gives all the available information on the points referred to by Captain Mullins.

8 I regret that the wording of the G. O. No. 361 of 22nd Nov. under sub para 4 "Approving" of Captain Mullins' recommendations in para 29

was

was misunderstood by me to "authorize me to proceed" with the Ancient & other works mentioned in that para in the sense of authorizing the expenditure necessary to carry them on. It was only last autumn that I was assured that he did not sanction the expenditure of money required to complete the authorized work. Meantime I had the working drawings of all the works nearly ready, to get the whole into form for submission in sufficient detail. This I have accordingly done. It is however now of great im-portance to get the approval of these plans & also the per-mission to draw the money necessary for them as early as possible.

I have &c

(Sd) Colonel H. Latham

Chief Engineer

17

List of Revised Plans & Estimates of (7th Section) Masonry Works.

23

Description of Plans	Estimates
General Plans of Head Works	Abstract Suppl. Estimate
Jatoor Anicut	Comparative Statement
Regulating Locks	Numeral Estimate No 1
Calingulah No: 2	do —— No. 1A ——
do " 4	—do —— No 2 ——
Culvert " 5 & 7	—do —— No 3-7A-16-19a-25a
Calingulah " 6	—do Estimate No 4 ——
do — " 9	—do —— No 5-7-10A
Detached Emptying Sluice	—do —— No. 6 ——
Plan of Pottala Vagoo	—do —— No 8-24 ——
Culvert 2 openings 20 feet	—do —— No 9 ——
" — 1 — " — 3 "	—do —— No 10 ——
Aqueduct No 19 & 20	—do —— No 11-12
Plan shewing position of	—do —— No 11A-24A
Aqueduct No 20	—do —— No 15-22
Culvert 3 openings 8 feet	—do —— No 17 ——
Plan alteration of Ayalam Bridges	—do —— No 19 ——
Culvert No 24	—do —— No 20 ——
" —— " 25	—do —— No 21 ——
" —— " 26	—do —— No 23.
2d & 3d Class Bridges	—do —— No 25
5 feet culverts General Plans	—do —— No 26

True copies

Fr: Hartwell Newton
Agent & Manager

No. 24

Madras Irrigation & C. Co.
Madras 18th February 1869.

From
The Agent and Manager
Madras Irr. & C. Co.

To
The Consulting Engineer
Irr. & Canal Compy.

Sir

I have the honor to forward herewith, revised Plans and Estimates, as per accompanying List, for the Masonry Works of the 7th Section, with Copy of the Chief Engineer's letter dated 13th February 1869, & request you will be good enough to obtain the early Sanction of Government for the expenditure therein proposed.

The letter from Mr. Ross referred to in para 3 of the Chief Engineer's letter was communicated to you with my No. 40 of 30th April 1868.

The enclosure alluded to in paragraph 7 has been called for & shall be forwarded to you immediately on receipt.

I have the honor to be
Your most obt. St.
Fr. Hartoll Newlow[?]
Agent ..

No. 626 Rent No. 7

1869

From The Agent & Manager S. I. R. Co.

To The Consulting Engineer S. I. R. Co.

Dated 18th } February /69.
Received 19 } Enc: 44
21 Plans
22 Estimates
1 Chief Engr. letter

Forwarding Revised Plans & Estimates of Masonry Works of the 7th Section for Sanction —

P. W. 859/69

Pro: 9th April /69. L 235 —

To Govt. No. 1228/3 March/69

Copy in a Letter to England
D/ 6th July No. 24 of 1869.

Conceding ... Print ... Madras ... Print

Superintendent

19

Pub: Works Dept:

1162

No. 1162

25

Proceedings of the Madras Govt:

Under date the 9th April /69.

Read the following:—

From the Consg. Engr. for the Madras Irg. Co — (R.E. No. 122 of 3d. March/69)

With this letter the Consulting Engineer for the Madras Irrigation and Canal Company submits masonry estimates, for the 7th Section of the Company's main Canal, which have been revised with reference to the Order of Government of the 22d. November 1867, No. 3611, in which sanction for the estimates, at that time submitted, and amounting

No.

W.O.M.

Appd

to

to Rs: 3,55,450 was withheld; and, while permission was granted for the construction of many of the works, the Consulting Engineer was directed to place himself in communication with the Chief Engineer, with a view to the alteration of the designs of some of the works, and to the preparation of more reliable estimates. The Govt: also declined to admit an overcharge of Rs: 33,910 without full and sufficient explanations.

2. The estimates now received amount to Rs: 3,59,179-10, and they

are

are somewhat in excess there-fore of those prepared 2 years ago. Capt. Mullins shows, however, that the present estimates include many additional works, and that, if the works included in both estimates be compared, there is a difference of rather more than half a lac in favor of those of this year.

3. With regard to the over-charges, the Cons. Engineer reports that the papers accompanying the estimates throw but little light upon the great difference between the expenditure prior to 1865, and the value of the work done; but, as

there

there is little likelihood of any further explanations being obtainable, he recommends that the excess expenditure should be passed. From recent reports the Govt: have learnt that the arrangements under which the Canal works are now being carried on are far more satisfactory than they were formerly, and they accede therefore to Capt: Mullins' recommendation, and grant permission for the removal of the retrenchment of Rs: 33,910.

4. The Cong: Engineer

also

also recommends the sanction of the revised estimates, with the exception of that part of them amounting to Rs: 45,110, which provides for 2 aqueducts, intended to carry the Canal across the supplying Channels of the Nundial Tank. These aqueducts have been designed with a Canal waterway of only 30 feet in width, although in Capt. Mullins' letter, transmitting the estimates of 1867, and a copy of which was communicated to the Agent, it was pointed out that the proper width would be 45 feet.

The

The Chief Engineer has given no explanation as to his reasons for adopting a design against the sufficiency of which strong grounds had been advanced; and, as the Right Hon'ble the Governor in Council concurs with the Cons: Engineer in considering that the velocity of 3 miles an hour, which, it has been shown, would be necessary to pass the full supply of the Canal, would be extremely objectionable on a first class Canal of navigation, he must withhold sanction to the designs as submitted, and they

should

22

28

should be revised so as to provide a clear width of 45 feet. His Excellency regrets that, owing to the commencement of one of these aqueducts in anticipation of the approval of the design, there will be some delay and also loss of money occasioned by the change; but, so far as he can judge, neither the Govt. nor the Consulting Engineer are in any way responsible for these results.

5. Deducting the estimated cost of the aqueducts, the supplemental sanction

re-

(9)

required is for Rupees
1,83,890, and this is
accordingly granted -

[illegible]

4 To the Con: Engr. I. R. Co.
4. .. Manager - do - do. with twenty one plans & twenty two Estimates.

Despd. 10/1/69.

19/3

13th March 1864 Pa. 20th

23

29

[redacted]

Copy in a Letter to England
d/ 6th July No 24 of 1869.

Inc 859

Govt. of {1869} Madras.

PUBLIC WORKS.

To The Consulting Engineer for Irrigation and Canal Company

Dated

Recd. Encl. 2

G. O. 9 April 1869, No. 1162.

R 26/3/69

Nos. 235-236

Seventh Section (Madras 1866)

Supplemental Estimate of Rs 1,83,890 for masonry works of the Seventh Section of the Company's Main Canal, Sanctioned with remarks.